JANICE LUCKMAN

SILICON

Element Symbol: Si
Atomic Number: 14

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It is the second most abundant element in the Earth's crust. Most common rocks are primarily composed of silicon and oxygen: they are silicates, and quartz and sand are composed of silicon and oxygen alone.

Natural compounds of silicon are the raw materials for some of the oldest technology such as stone tools. Silicon is also a key component in glass, first made around 2500 BC in Mesopotamia by melting sand and soda in a furnace. As well as being used to make containers and ornaments, the discovery of glass and perfecting of grinding methods led to the development of lenses for telescopes, allowing scientists such as Galileo to see into the heavens and change our view on our place in the Universe.
For a long time, silica (a combination of silicon and oxygen) was considered an element and amorphous silicon was not isolated until 1824 by Jons Jacob Berzelius. Crystalline silicon was made in 1854, by the French chemist Henri Deville.

If one element divides the modern world from that before the Second World War, it is silicon. For a long time, there was no clear use for pure silicon. However, silicon is the most common metalloid: it is not a metal but has some metal like properties, especially that it conducts electricity, although poorly. Silicon is a semiconductor. This property means that the electrical conductivity of silicon can be finely tuned, by 'doping' a piece of silicon with a small number of atoms of another element (e.g. arsenic or boron). In this way silicon is used as the basis for most solid state transistors, an essential component in all modern electronics. Silicon is also an essential component in typical solar cells. The largest application of silicon (~ 55% of the world consumption), is in the manufacture of aluminium-silicon alloys to produce cast parts, mainly for the automotive industry. The second largest application of silicon (~ 40% of world consumption) is as a raw material in the production of silicones, compounds containing silicon-oxygen and silicon-carbon bonds. These form polymers with useful properties such as impermeability to water, flexibility and resistance to chemical attack. Silicones are used in waterproofing treatments, mechanical seals, high temperature grease and waxes, breast implants, explosives and pyrotechnics. Whilst most silicones are soft polymers, silicon carbide and silicon nitride are hard, tough materials used for making cutting tools, abrasives and as engineering components resistant to heat.

Provided by the element sponsor sponsor Emily Hilder

ARTISTS DESCRIPTION

From the information I received about silicon I was drawn to the image of the skeleton of the sea sponge Venus Flower Basket, and the intricate and delicate pattern formed by its bones of silica glass. As I found this to be visually quite beautiful I have digitally reproduced the effect of this pattern for my print.

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